A MAORI BIRDMAN KITE IN THE AUCKLAND MUSEUM

A description and an account of the conservation treatment

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Abstract. This paper discusses conservation treatment needed to stabilise the fragile condition of a rare Maori kite in the Auckland Museum collection. Identifications were carried out to ascertain the materials used in the kite's construction and library and archival research undertaken to establish the history of the kite's deterioration over the century it has been in the Museum's care.

Maori kite makers fabricated a variety of kites from small, easily made ones of few materials to larger more complicated structures imbued with spiritual power. The accepted general term used for kites is *manu* (bird) followed by a definition, for example, *manu aute*, *manu taratahi*, or *manu kaka* (Best 1976: 122-144).

Kites had a place in several facets of Maori society, ranging from children's games and more serious adult kite flying competitions to playing a role in tribal politics. There are 19th century accounts of kite flying contests involving 20 to 30 men controlling kites soaring at the end of 700 metres of line. Other kites possessed special qualities and could only be flown by men of rank or by priests (Walsh 1912). In times of war, kites were used to divine whether or not to carry out an attack (Cowan 1955:369). Land claims have been made or substantiated because of kites and there are a number of accounts of tribal groups being able to lay claim to the locality their run-away kite fell upon with the reasoning that the kite had invested their mana in the land where it fell (Walsh 1912).

The social changes in New Zealand during the 19th century saw, along with other Maori lifeways, the end of the art of kite making as a popular craft. The birdman kite in the Auckland Museum (Fig.1) is one of two remaining examples of this type of kite in existence, the other is in the British Museum (Fig.2). These kites, known as *manu aute*, were regarded as particularly fine kites because of the way their wings quivered when in flight. They were not high fliers and the length of the line was at best 150-200 m long. Constructed in the mid-1880's the Auckland Museum kite is a superb example of Maori craftsmanship responding to the availability of non-traditional materials in order to create an artefact of pre-European antecedents (Figs.3,4).

Description

The kite has a wingspan of 3.53 m and a body length (from top of head to claws) of 1.27 m. The maximum thickness of its structure rarely exceeds 1 cm, the diameter of

Fig.1. The Auckland Museum kite, *c.*1890. It was constructed in about 1885 by a kitemaker living in the East Coast region of New Zealand. Photograph: Auckland Institute & Museum

the most substantial structural elements making up the wings and body frame. The kite consists of two components: the mask, and the body and wings.

The body and wing framework is formed from twigs and sticks which create a very strong but lightweight support for the fabric of the kite. Two timbers have been used. The framework is of manuka (*Leptospermum scoparium*) or kanuka (*Kunzea ericoides*), both family Myrtaceae, and the side struts of the upper body and head are of a vine known as supplejack (*Ripogonum scandens*). Sticks range in diameter from 2 to 10 mm. Binding the structure into a single unit are small diagonal lashings of two-ply flax cord at most points where the sticks cross each other at right angles (Fig.5).

The wings are made of 12 longitudinal struts braced at right angles by 45 groups of much thinner sticks. These groups at the wide part of the wing surface close to the body comprise 6-7 parallel twigs *ca.* 3 mm apart. Towards the wingtips the number falls to 4 or 5 twigs per group. At the wingtips further bracing is supplied with two groups of twigs forming a cross formation at 45 degree angles to the other structure (Fig.6). To obtain the 3.53 m wingspan the sticks have been tapered at their ends so that they can be lashed together side by side without thickening the strut.

The body framework consists of 7 vertical running struts running from the curved bottom of the body to the neck area. To shape the structure to which the mask is fixed the manuka or kanuka sticks are substituted in one context with split supplejack. This piece, because of its inherent flexibility forms the upper half of the right hand strut and is bent, first, into the neck, then out and around to form the outline of the head and the other neck indentation before straightening out to become the upper half of the left hand strut of the body (Fig.7). Bracing these vertical struts are groups of thinner sticks identical to those used on the wings. At the bottom of the body two short additional struts have been inserted into the framework to run vertically to the second group of cross struts. Both the wing and body have been partially painted with black and red pigments, the colours alternating with each group of thin struts.

The fabric of the kite consists of two layers. Against the wood framework, using two-ply flax cord, are tied strips of raupo or bullrush leaves (*Typha muelleri*) 2-3 cm wide and, covering these, in effect making the back of the kite, is a plain weave cotton fabric sewn to the frame with linen thread (Fig.8). Along either side of the body from the wing to the feet is a plait of red, yellow and blue wools — now largely missing.

The legs are constructed from a thick plait of New Zealand flax (*Phormium tenax*) which tapers at each end to form the ankles, and this is covered with the cotton textile. The feet are bunched sticks of the kanuka or manuka, each of which is spread to terminate in 4 claws up to 30 mm long covered with red coloured wool (Fig.9).

The face of the kite (Fig.10) is an extremely rare example of Maori mask making. The basic structure of the mask (Fig.11) is made from split supplejack tied with flax cord into a shape upon which the contours of the face could be created. Over this framework were placed pages from an 1884 copy of the New Zealand government gazette, Ko te Kahiti o Niu Tireni, anchored in place with sewing thread (Fig.12). Areas which needed higher contours than the supplejack framework provided were padded out with black coloured cotton wool. These are the cheek-bone areas, the tip of the nose, and the chin. Overlying the newsprint and cotton wool is a sheet of beaten bark fabric. No positive identification has been made except that it has been determined that the bark cloth is not beaten ribbonwood or lacebark (*Hoheria* spp.) which were utilised on occasion in New Zealand. Possibly it is a rare piece of *aute*, the Maori name for bark cloth beaten from the paper mulberry (*Broussonetia papyrifera*). Fixed to this bark cloth surface are the mouth and eye details. These consist of an undetermined tubular core covered with a linen textile which in turn is largely covered with a black coloured flax cord tied into place with half-hitch knots. The eyes are built up from paua shell (*Haliotis iris*) discs but the mouth is sewn directly to the mask.

Fig.2. The only other *manu aute* in existence, now in the British Museum, was made sometime before 1843. Photograph: D. Simmons, courtesy British Museum

Fig.3. A drawing, dating to 1818, from a page of sketches of Maori kites drawn by Titerree, a Ngapuhi chief who was residing in England at the time. Photograph: Auckland Public Library

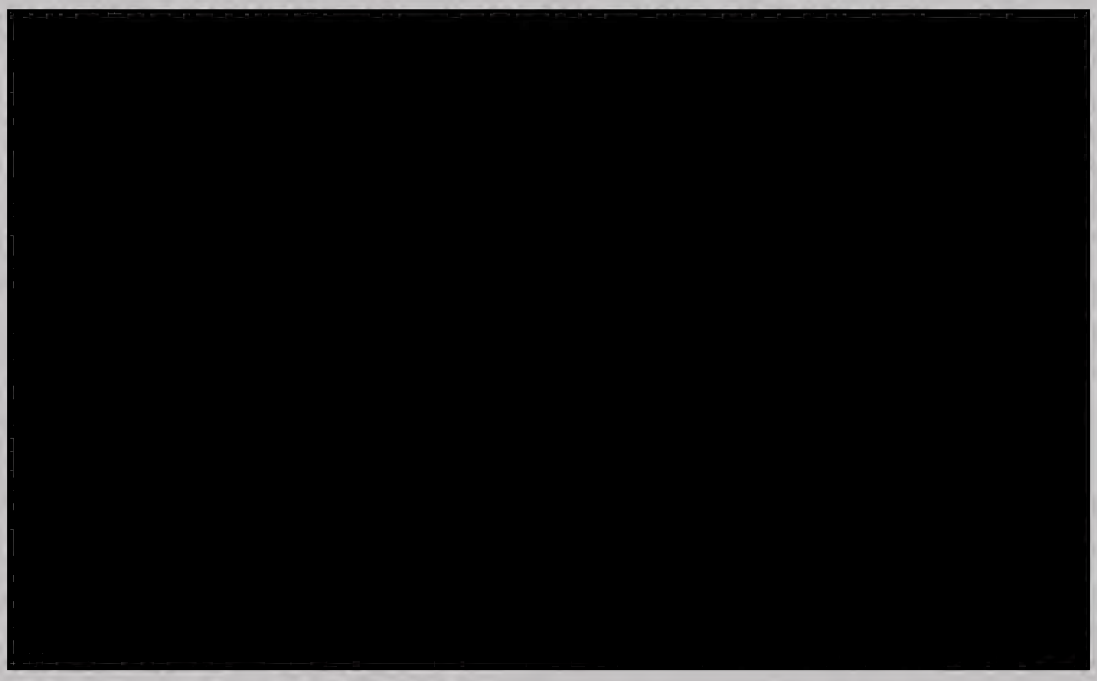

Fig.4. This sketch of a *manu aute* was made by the Maori scholar Te Rangi Kaheke in 1859. Photograph: Auckland Public Library

Fig.5. Detail of the wing and body construction of the kite. The parts of the framework which are wrapped in flax cordage for 5-6 cm of their length are the places where the tapered ends of structural members have been joined to make the wing framework.

Fig.6. The wing tip construction.

Fig.7. Detail of the mask mount. The curved edge strut of this area is split supplejack selected for its flexibility. All other bracing and structural wood is kanuka or manuka. The raupo leaf lining under the framework is clearly visible.

History

The kite was made sometime between 1884 and 1886, the year Sir George Grey presented it to the Museum, by a kite maker in the East Coast region of the North Island of New Zealand. The kite was on open display from 1892 until about 1970 when a newly appointed ethnologist, concerned about its appearance, removed it from its sunlit place on the gallery wall to save it from further deterioration. Over these years the kite had undergone several restorations and repairs (Figs.13,14), most of which had disappeared by 1970. One however was of a more permanent nature. In 1929, the right leg for some inexplicable reason was forced out of its original alignment into an inward curve so that the claws pointed roughly towards each other (Fig.9). To keep the leg in its new position a tensioned brass wire 1 mm in diameter was pushed into the leg's flax core. The cotton which covered the leg was then crudely stitched back over the flax. Also by this time the cotton textile had begun to disintegrate about the legs and ankles (Fig.9).

Fig.8. Detail of cotton back to kite showing the stitching holding the textile to the raupo and wood framework.

Fig.9. The condition of the feet and legs in 1984. The misalignment of the kite's right leg (compare with Fig.1) is intentional and dates back to the 1929 "restoration" work.

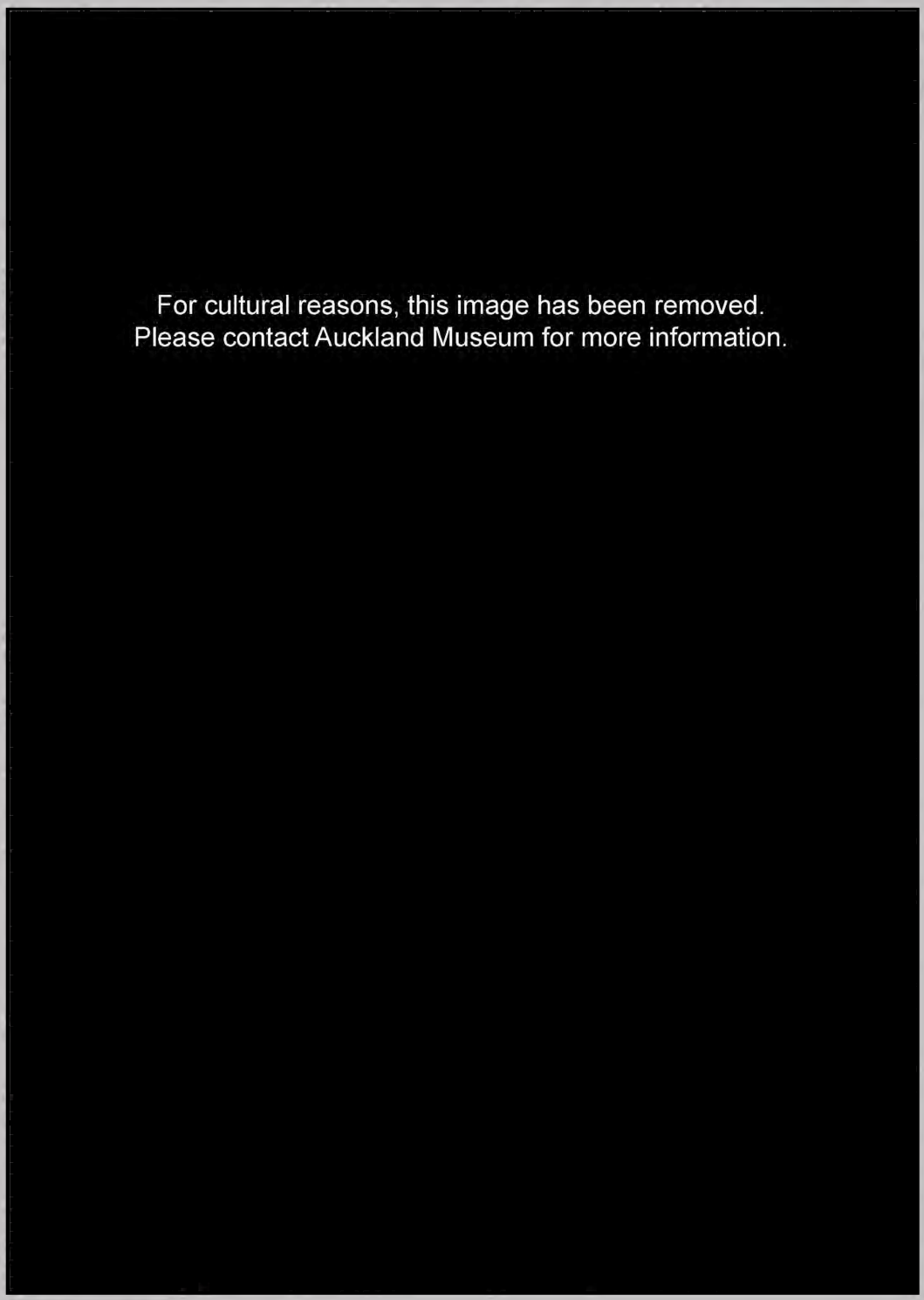

Fig. 10. The mask of the kite as it exists today. Compare with Fig. 1 to see the deterioration its composite materials have undergone in the century since its fabrication.

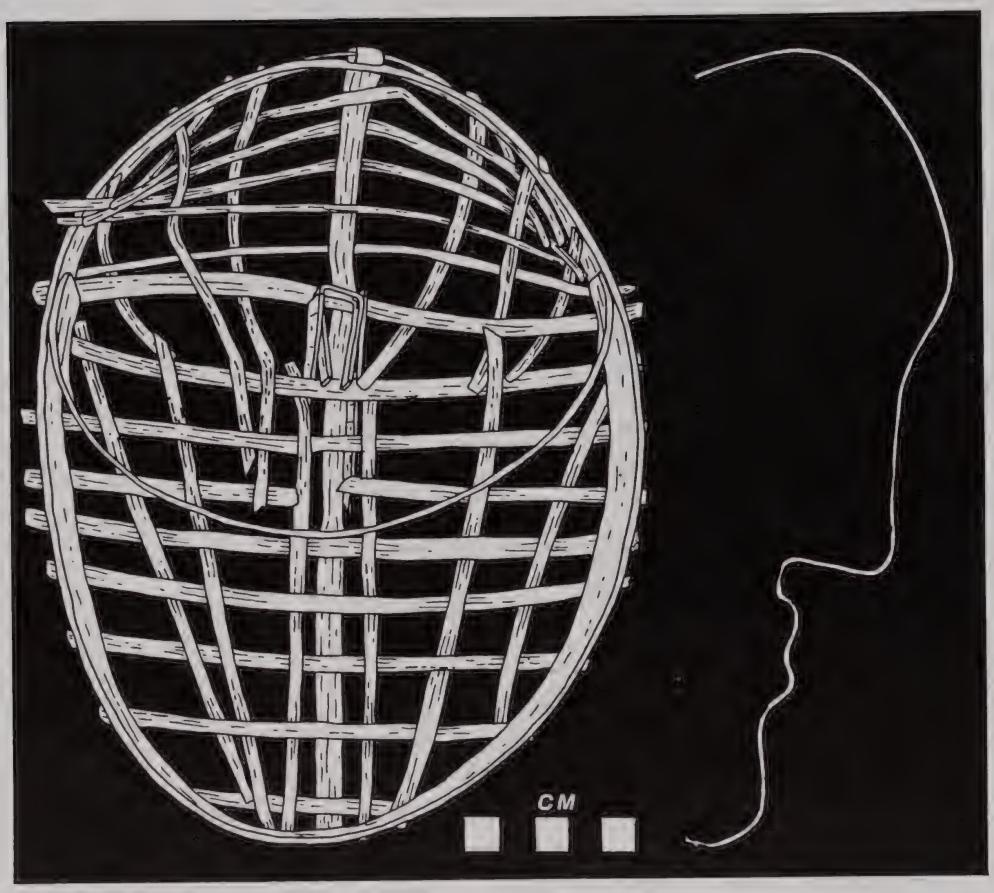

Fig. 11. The mask frame of split supplejack as viewed from behind the face. The profile of the frame is on the right.

A comparison between the 1890's photograph (Fig. 1) and the kite in 1984 shows a number of the losses sustained over the years. With the exception of the missing battens at the feet the losses are all from the mask. Missing is the linen or calico upon which had been painted the moko or facial tattoo and the four, pointed teeth from the mouth. The hair, created by splitting the shafts of flight feathers from the kahu (Australasian harrier, *Circus approximans*) has completely disappeared as have the shark's tooth pendant from the right ear and some sort of collar or wrap about the neck of the figure. In an attempt to preserve the degrading cotton textile and the bark cloth the face and the feet areas were sprayed with polyurethane and the kite placed in storage until 1984 when its conservation commenced.

Fig.12. A close focus picture of the newsprint covering the supplejack frame of the mask.

Fig.13. A detail from a photograph of the Prince's Street Museum's Ethnographic Hall *c.*1905 showing the kite already deteriorating. Note the loss of feather 'hair' and its partial replacement with stiff quills. Photograph: Auckland Institute & Museum

Fig.14. A detail from a photograph published in 1924 showing restoration work on the head. Photograph: National Museum, Wellington

Conservation

The Body. The liberal application of polyurethane had, along with consolidating the textile, fixed its contours into the folds and creases created when the right leg was re-shaped in 1929. It had also bonded the accumulated dust of 4 decades of open display conditions to the textile. The hope was to be able to remove enough of the polyurethane in order to clean some of this dirt and second, re-introduce more flexibility into the textile to enable the alignment of the right leg back into its original position to take place.

Polyurethane resins are created by combining compounds containing two isocyanate (NCO) groups with compounds containing two hydroxyl (OH) groups. The compounds vary between proprietary brands and in the case of the resin sprayed on the kite the compound with the hydroxyl groups is a polyester. Spraying the polyurethane onto the weak cotton fabric subjected the degraded textile to chemical and mechanical damage. The polyurethane used was a moisture curing resin. Its resin curing process involves a reaction between the isocyanate groups and available hydroxyl groups which, promoted by atmospheric moisture and moisture in the substrate to which the

resin is being applied, crosslink to form an impervious amide linkage. When, as in this situation, the substrate is cellulose it is likely that amide links are also formed between the side hydroxyl groups of the cellulose molecules as well as with the polyester (Fig.15). Consequently rather than merely coating the cotton fibres the polyurethane had become an integral part of their structure. Part of the strength of cotton is provided by its water content which gives the fibres their plastic quality. Because any available moisture is used in the crosslinking process of the resin the cotton fibres become dessicated as the resin cures. This results in a loss of flexibility in the fibres at precisely the time they are being subjected to powerful stresses by the curing resin. During the curing a shrinkage in resin volume of 1-2 per cent occurs through crosslinking processes and because of solvent loss. This shrinkage subjects the textile to surface and internal stresses before locking the weave into the resin.

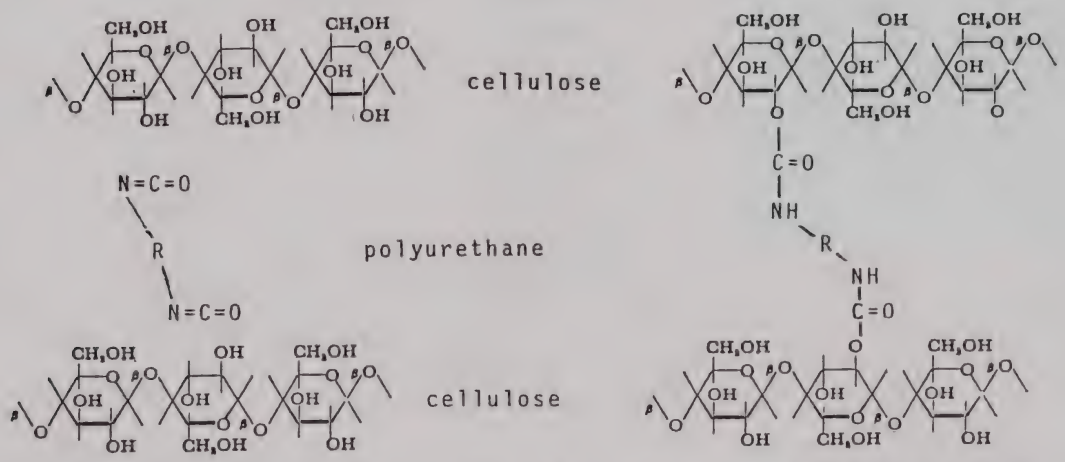

Fig.15. The reaction between cotton fibre and polyurethane resin. Left. Cellulose chains in contact with polyurethane resin. Right. The cellulose chains bonded together into an impervious amide linkage.

By 1984 the resin had aged to the point that the textile was again breaking up. This disintegration was characterized by very brittle fibres which allowed sections of the impregnated cotton to break off from the kite with no physical encouragement other than gravity alone. The polyurethane-cotton because of the above described processes was in a poorer condition than adjacent areas of untreated cotton and consequently removing the resin (in the unlikely event that it was even possible) was out of the question.

It was decided to manipulate the stiff textile as carefully as possible into its original shape and back it with another textile which would provide it with the support it so urgently required. Stitching done in 1929 was unpicked and the aged textile folded away from the legs and ankles of the kite. Carrying out this process inevitably resulted in more of the rigid textile breaking up. The plaited flax legs were re-aligned, severed flax fibres rejoined using PVAcetate emulsion (Promatco A1023) and new strengthening provided by inserting a slender wooden splint into each leg (Fig.16). The backing fabric was then slipped under the original cotton textile. The fabric selected

Fig.16. The legs and feet after removal of the brass rod and unfolding of the old, polyurethane impregnated cotton textile. To strengthen the legs a thin wooden splint was inserted into the flax plait on both sides.

was a polyester with a similar weave texture and colour to the 19th century cotton. Stitching this to the polyurethane impregnated cotton was impossible as the deteriorated fibres simply snapped with the pressure of the needle and sewing thread. Consequently the polyester was coated with a heat sealing PVAcetate (Mowilith DM44H) diluted to a 1:3 solution and ironed to the cotton.

It was a painstaking task as the frail cotton regularly split, first when being bonded to the polyester, and later when being wrapped about the legs of the kite. This meant tacking and re-tacking small pieces and margins of the cotton to the polyester. Another difficulty encountered was that the quantity of PVAcetate emulsion required to bond the two textiles together gave the polyester a glossy surface. This did not matter where bonding took place but where there were holes in the cotton textile, and where whole pieces of it were missing, the glossy surface of the polyester was exposed. This was eventually minimized by dissolving the Mowilith film with acetone applied with a fine brush and, a few seconds later, blotting the area with absorbent paper.

Other areas of the kite body which required some attention were various broken twigs in the framework, fractured pieces of raupo, and snapped flax fibre lashings. All repairs were bonded with the Promatco A1023.

Up until this point cleaning had been restricted to only areas that needed strengthening in order to avoid handling the kite unnecessarily. Now that the structure was stable it could be cleaned completely. This was carried out using a soft sable brush to lift up dust while simultaneously vacuuming the area under treatment. The efficiency of this method was clearly shown when the grey coloured cotton covering the back of the kite became a buff colour as vacuuming progressed across the back of the kite. On the front care had to be taken with the raupo as the inner membrane of the leaves of this plant which are exposed on the kite are extremely thin and brittle. The fragile nature of the raupo also meant that the obtrusive catalogue number on the body (see Figs.14,16) could not be taken off by mechanical or solvent cleaning. Consequently it was not removed but instead disguised by painting over it with water colours.

The only aqueous cleaning carried out was on the wool covering the claws which were dusty and discoloured. As brushing had proved ineffectual they were washed in a weak detergent solution with some brightening of colour resulting (Hofenk-de Graaff 1968).

The Mask. This was attached to the kite by some large stitches which were judged to date back to the restoration work of 1929. These were cut and the mask removed from the kite. As well as the problems associated with the extremely fragile nature of

Fig.17. The top of the mask showing one of the several broken supplejack frame members, and the degraded nature of the newsprint and beaten bark cloth.

the ageing newsprint, bark cloth and cotton wool, the mask had also sustained structural damage from insect attack and poor handling. Four supplejack cane struts at the top of the head were snapped and their covering torn suggesting that the head had been crushed and later casually pulled back into shape (Fig.17). These fractures required butt joining. To provide the requisite strength to the joins several layers of Japanese tissue were wound round the break using diluted Promatco A1023 as the adhesive. The dilution varied with the amount of tack needed with each repair.

With structural strength regained the interior and exterior of the mask were cleaned of dust and insect frass by brushing with a soft brush and using a vacuum cleaner. The paua shell eyes were cleaned with acetone applied with cotton wool swabs.

The face of the mask like the legs had earlier received a spray of polyurethane in an attempt to consolidate the disintegrating newsprint, bark cloth and cotton wool. Whatever effect this had once had was now lost and the bark cloth was delaminating. A paste of 2% w/v CMC in water was applied to these areas with a stiff pointed brush. The problem now remained as to what to do with the ragged areas of newsprint and bark cloth on the head. Once these two materials would have completely covered the framework but extensive losses over time had left only patches still in situ, held in place by only the most tenous of links with adjacent pieces. When the mask was removed from the kite a number of pieces were found in the space under the head where they had fallen inwards over the years and there were enough to warrant an attempt to partially re-cover the head. This was done by spreading one piece of Stabiltex over a ball of tissue paper the same size as the head cavity. The mask was placed over this, the loose fragments of newsprint and bark cloth laid on top, and then a second piece of Stabiltex spread over the whole head — in effect sandwiching the fragments. By passing a curved sewing needle through the framework where no paper or bark cloth lay the bottom piece of Stabiltex was then hooked up by the needle and drawn towards the upper piece by the sewing thread. The thread was then knotted. The final effect was one of rather rough quilting with all the loose original material securely anchored between the almost transparent Stabiltex. Lastly a small amount of trimming and tailoring was done to make the stabiltex as unobtrusive as possible.

Conclusion

This project emphasizes the importance of ethnographic conservators being closely involved with curatorial research when looking at conservation requirements of artefacts under their care. At Auckland Museum the conservators are encouraged to carry out such research as part of condition reporting. In the case of the kite this policy resulted in an interesting situation for, as more information about the kite's history came to light, there developed an almost inverse ratio between the research and plans for actual treatment: more of the former and less and less of the latter as the project progressed. At the outset of this project the curatorial directive was to restore the kite to its 1890's appearance but by the completion of the project 2 years later the kite had only been stabilized to its existing condition. Instead a replica of the most damaged part of the kite, the mask, is being created in order to show how the kite originally appeared. This is a far more satisfactory plan although one not particularly apparent before the research was carried out.

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